

CLAIMS

What is claimed is:

1. A wire winding machine comprising:
a pair of rotatably driven spaced apart mandrels;
5 a traverse for guiding wire onto each one of the pair of mandrels, one mandrel at a time;
the traverse being moveable between first and second positions such that in the first
position the traverse acts to guide wire onto one of the mandrels and in the
second position the traverse acts to guide wire onto the other mandrel; and
wherein the traverse is moveable along an arcuate path as the traverse moves between
10 the first and second positions.
2. The wire winding machine of claim 1 wherein as the traverse moves between the first
and second positions, the traverse swings about an axis.
3. The wire winding machine of claim 1 including a frame structure and wherein the axis
extends transversely across the frame structure of a wire winding machine.
- 15 4. The wire winding machine of claim 2 including a double acting fluid cylinder for swinging
the traverse between the first and second positions.
5. The wire winding machine of claim 1 including a frame rotatably mounted on a shaft, the
traverse being mounted to the frame and moveable therewith.
6. The wire winding machine of claim 5 including a fluid cylinder operatively connected to
20 the frame for moving the frame back and forth about the shaft.
7. The wire winding machine or claim 6 wherein the cylinder is connected between a frame
structure associated with the wire winding machine and the frame.
8. The wire winding machine of claim 5 wherein the frame includes a cradle suspended
from the shaft.

9. The wire winding machine of claim 5 wherein the frame includes a generally rectangular frame structure and a pair of swing arms, the swing arms being secured to the rectangular frame structure and rotatably journaled around the shaft such that the rectangular frame may swing back and forth on the shaft.

5 10. The wire winding machine of claim 1 further including a single transfer arm for transferring wire from one mandrel to another mandrel.

11. A wire winding machine comprising:

a pair of spaced apart mandrels;

a traverse for guiding wire onto each one of the pair of mandrels, one mandrel at a time;

a frame having said traverse mounted thereto;

the frame being moveably mounted for swinging movement about an axis; and

an actuator operatively connected to the frame for moving the frame back and forth

resulting in the traverse being moved back and forth about an arcuate path.

12. The wire winding machine of claim 11 including a shaft for supporting the frame and wherein the frame is moveable back and forth about the shaft.

13. The wire winding machine of claim 11 wherein the actuator includes a double-acting fluid cylinder operatively connected between the frame and a frame structure associated with the wire winding machine.

14. The wire winding machine of claim 12 wherein the frame includes a pair of spaced-apart arms with the arms being rotatably journaled about the axis of the shaft.

15. The wire winding machine of claim 11 wherein the frame comprises a generally rectangular closed frame that includes at least four members interconnected with the individual members being disposed at generally right angles to adjacent members.

16. The wire winding machine of claim 11 wherein the traverse is cantilevered from the frame and projects outwardly therefrom.

17. A method of winding wire onto each of two mandrels of a dual head wire winding machine, comprising:

- a. directing wire to a traverse and from the traverse to one of the two mandrels;
- b. winding wire on one mandrel and then transferring the wire to the other mandrel, and
5 continuing to wind wire on the respective mandrels, one mandrel at a time, and transferring the wire from one mandrel to another;
- c. moving the traverse from one position to another position in the course of transferring wire from one mandrel to the other; and
- d. wherein moving the traverse from one position to another includes swinging the
10 traverse in an arcuate path between the positions.

18. The method of claim 17 including confining the traverse between the axes of the two mandrels.

19. The method of claim 17 wherein the traverse is mounted to a frame that is suspended from a shaft, and wherein there is provided an actuator for moving the frame about the axis of
15 the shaft such that the traverse is moved between the two positions.

20. The method of claim 17 including cantilevering the traverse from the frame and suspending the frame from a support structure that permits the frame to move back and forth about an axis.

21. The method of claim 20 including suspending the frame from a shaft and utilizing a
20 double-acting fluid cylinder to move the frame back and forth about the axis of the shaft, resulting in the traverse being moved back and forth in an arcuate path.

22. A wire winding machine comprising:
at least one mandrel for winding wire;
25 a traverse for directing wire to the mandrel; and

a wire directional control device for receiving the wire being directed to the mandrel and engaging the wire in such a manner that the wire can move through the device in one direction but is prohibited from moving through the device in a direction, generally opposite the one direction.

5 23. The wire winding machine of claim 22 wherein the wire directional control device includes a pair of control rollers that engage the wire and permit the wire to move therebetween.

24. The wire winding machine of claim 23 wherein one of the control rollers is bodily movable with respect to the other roller.

10 25. The wire winding machine of claim 24 wherein the bodily movable control roller is mounted on a pivoting arm.

26. The wire winding machine of claim 25 wherein the pivoting arm is oriented such that the wire freely moves between the control rollers in one direction and binds when the wire is urged in an opposite direction.

15 27. The wire winding machine of claim 23 wherein the wire directional control device includes a pair of inlet idler rollers and a pair of outlet idler rollers and wherein the control rollers are disposed between the inlet and outlet idler rollers.

28. The wire winding machine of claim 27 wherein one of the control rollers is rotatably mounted about a fixed axis while the other control roller is mounted on a pivot arm and is moveable back and forth with respect to the roller mounted about the fixed axis.

20 29. The wire winding machine of claim 28 wherein the moveable roller mounted on the pivot arm is spring-biased towards the fixed control roller.

30. The wire winding machine of claim 29 wherein the spring-biased control roller is operative to move and permit a wire to move between the two control rollers in one direction but is operative to bind against the wire when the wire is moved in a generally opposite direction

25 thereby preventing the wire from moving in the opposite direction.

31. The wire winding machine of claim 30 wherein each control roller includes an aggressive surface.

32. The wire winding machine of claim 31 wherein the aggressive surface includes a series of vertical wire engaging elements that project outwardly from each control roller.

5 33. A wire winding machine comprising:

at least one rotatable mandrel for winding wire thereon;

a traverse for moving back and forth and guiding the wire onto the mandrel as wire is wound onto the mandrel;

a wire directional control device mounted on the traverse for receiving wire being fed from the traverse to the mandrel, said wire directional control device including:

- i. a pair of rollers mounted adjacent to each other and including a fixed roller and a movable roller with the fixed roller being mounted about a fixed axis and the movable roller being mounted on a movable arm and movable back and forth with respect to the fixed roller;
- ii. wherein a wire passing from the traverse is fed between the fixed and movable roller and passes therethrough as the wire is fed to the mandrel; and
- iii. wherein the movable roller and arm are oriented relative to the fixed roller such that the wire can move between the fixed roller and movable roller in a first direction and wherein the orientation of the movable roller and arm relative to the fixed roller is such that the wire will bind between the rollers if moved in a direction generally opposite the first direction, whereby the wire directional control device permits the movement of the wires through the device in a first direction but prevents the wire from moving back through the device in a direction generally opposite the first direction.

34. The wire winding machine of claim 33 wherein the movable roller is biased towards the fixed roller.

35. The wire winding machine of claim 34 wherein the arm having the movable roller mounted thereto is pivotally mounted.

5 36. The wire winding machine of claim 35 including a pair of inlet idler rollers and a pair of outlet idler rollers, and wherein the pair of control rollers are disposed between the inlet and outlet idler rollers.

37. The wire winding machine of claim 35 wherein each control roller includes an aggressive surface for engaging the wire being fed therebetween.

10 38. The wire winding machine of claim 35 wherein the axis of rotation of the movable roller is maintained on one side of a reference line extending between the axis of rotation of the fixed roller and the axis of rotation of the arm.

39. The wire winding machine of claim 38 wherein the axis of rotation of the movable roller is maintained on a downstream side of the reference line.

15 40. The wire winding machine of claim 38 wherein the control rollers and idler rollers are mounted on a frame.

41. The wire winding machine of claim 38 wherein the movable roller is biased towards the fixed roller by a spring operatively connected to the movable roller and fixed at a point spaced from the movable roller.